

Homework 5  
Honors Physics

1. A green 15 kg ball moving 18 m/s hits a non-moving red 20 kg ball. After they hit, the red ball is moving to the right at a 81 degree angle from the green ball's original direction. The green ball is now moving at a 9 degree angle to the left of its original direction.
  - a. What is the red ball's final velocity?
  - b. What is the green ball's final velocity?
2. An alpha particle (mass =  $6.64 \times 10^{-27}$  kg) moving  $1.50 \times 10^7$  m/s hits a gold atom (mass =  $3.27 \times 10^{-25}$  kg). After they hit, the gold atom is moving to the right at a 22 degree angle from the alpha particle's original direction. The alpha particle is now moving at a 68 degree angle to the left of its original direction.
  - a. What is the alpha particle's final velocity?
  - b. What is the gold atom's final velocity?
3. A truck (mass = 2800 kg) is traveling south with a speed of 30 m/s. A car (mass = 2250 kg) is traveling east with a speed of 35 m/s. If they collide and stick together, what is their final velocity (give magnitude, angle, and direction)?
4. A truck (mass = 3525 kg) is traveling north with a speed of 21 m/s. A car (mass = 2600 kg) is traveling west with a speed of 32 m/s. If they collide and stick together, what is their final velocity (give magnitude, angle, and direction)?